

Earthquake Restrainers (Contract No. C-64158)

The as-built drawings, which are contained in these CDs, are scanned from drawings of the existing structure for the convenience of the contractor and as a means to convey to the contractor the available information regarding the existing structure. It is to be understood that no claim is being made as to the accuracy or completeness of the said information and that the State of California or its officers or agents shall not be responsible for the manner in which the contractor interprets and uses this information or for the accuracy, currency or completeness of these scanned as-built drawings. The contractor shall be responsible to obtain, at the contractor's expense, any additional information that the contractor deems necessary for completely and accurately assessing the existing conditions of the structure. The contractor shall not be entitled to any compensation for any claim arising from inaccuracy or insufficiency of these as-built drawings or in anyway related to these drawings.

[1. Project Plan and Elevation](#)

[2. General Plan-W1 to E1](#)

[3. General Plan-E4 to E39](#)

[4. Restrainer Location Plan-YA1 to 4](#)

[5. Restrainer Location Plan-E17 to E22](#)

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[9. Restrainer Type 1](#)

[10. Restrainer Details-Type I & Type III](#)

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[12. Restrainer Details-Type II](#)

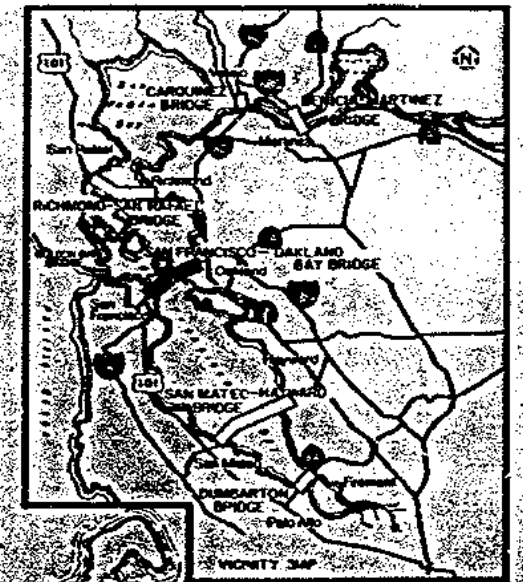
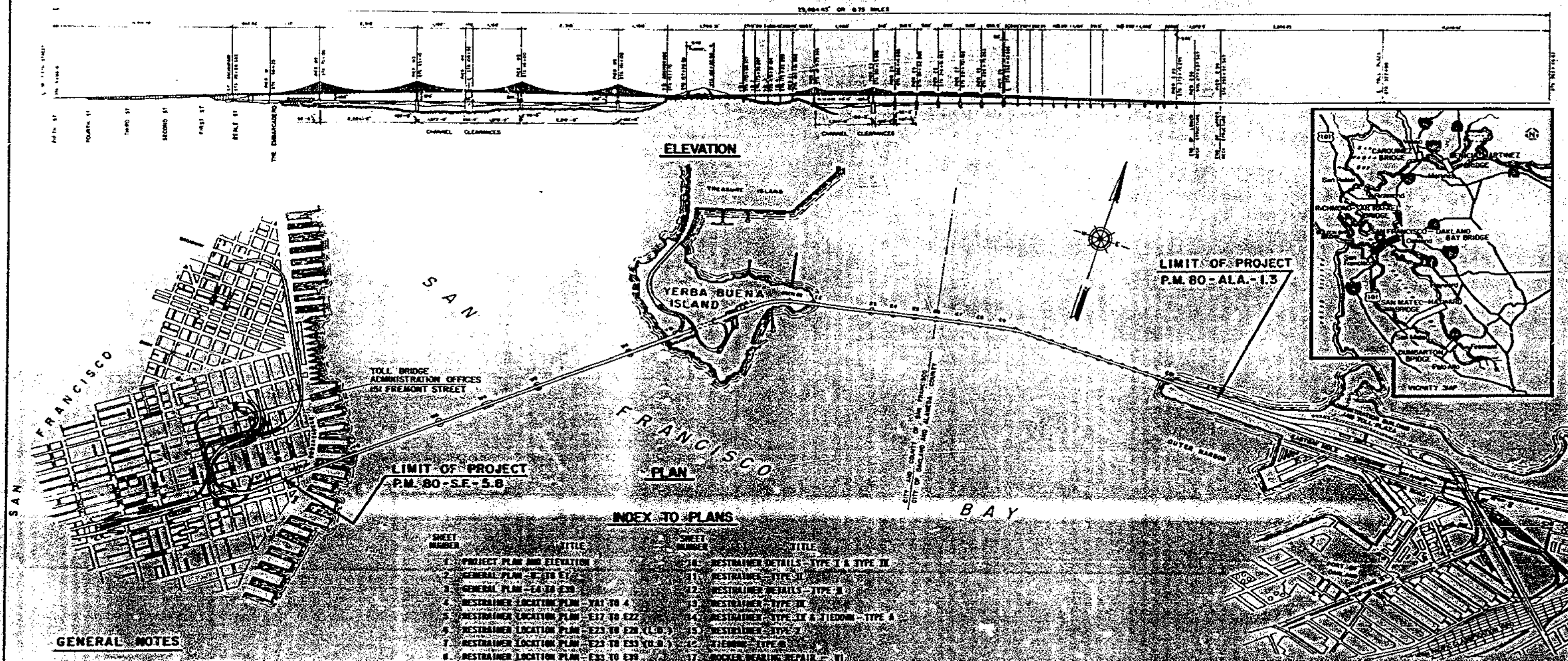
[13. Restrainer -Type III](#)

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[17. Rocker Bearing Repair-W1](#)



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2	GENERAL PLAN - E-1 TO E-10
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4	RESTRAINER LOCATION PLAN - E-1 TO E-4
5	RESTRAINER LOCATION PLAN - E-5 TO E-10
6	RESTRAINER LOCATION PLAN - E-11 TO E-20
7	RESTRAINER LOCATION PLAN - E-21 TO E-30
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10	RESTRAINER DETAILS - TYPE I & TYPE II
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12	RESTRAINER DETAILS - TYPE III
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14	RESTRAINER - TYPE V & TIEDOWN - TYPE A
15	RESTRAINER - TYPE VI
16	TIEDOWN - TYPE B
17	ROCKER BEARING REPAIR - VI

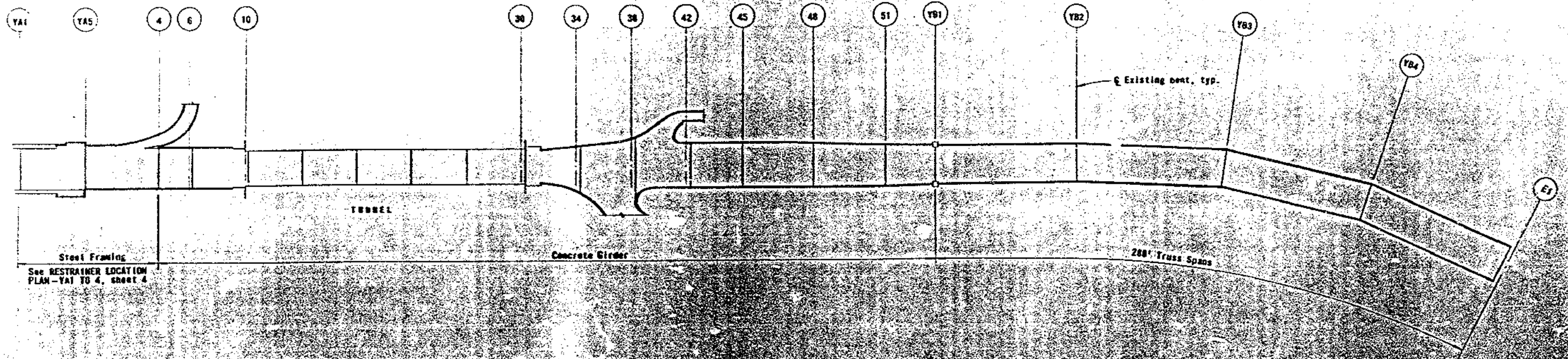
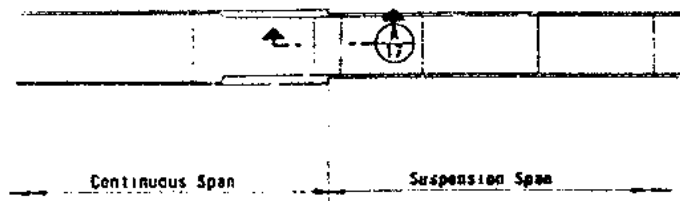
GENERAL NOTES

1. MHW = E1 + 9.00 at S.F.O.B.S.
USC & GS Mean Sea Level datum of 1929 = E1 + 3.10
MLLW = E1 - 0.00
2. Dimensions shown for existing members are taken from construction drawings. The Contractor shall field verify and adjust all dimensions to fit existing conditions since variations are to be anticipated. (Refer to Article 2.23 of the SPECIAL PROVISIONS)
3. Unless designated by the word "existing", all work shown shall be performed under this contract.
4. All bolted joints shall be friction type connections made with ASTM A325 high strength bolts with nuts and washers. Develco washers shall be provided where required.

AS BUILT PLANS
Contract No. 04-64158
Date Completed
Document No.

STATE OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION	
San Francisco - Oakland Bay Bridge	
EARTHQUAKE RESTRAINERS	
PROJECT PLAN AND ELEVATION	
NOVEMBER 12, 1974	
[Signatures]	

W

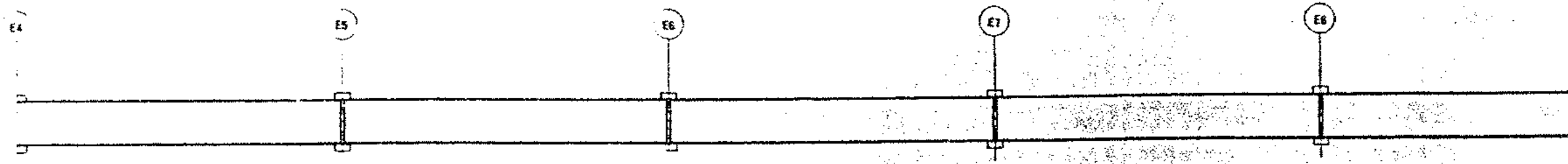


AS BUILT PLANS
Contract No. 04-64156
Date Completed
Document No.

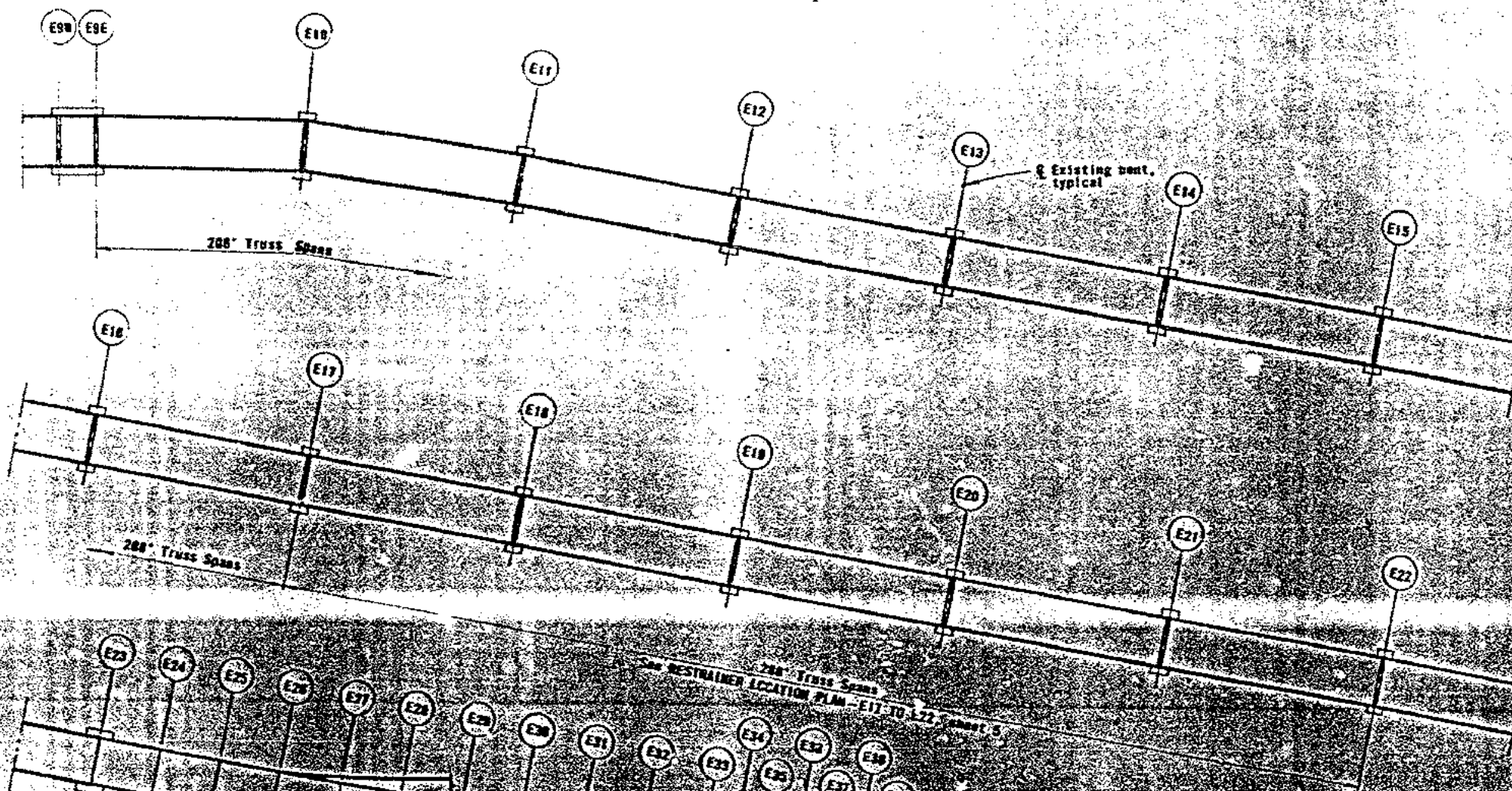


DATE	12/12/1974	BY	CHL
DATE	12/12/1974	BY	CHL

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION	
DESIGNED BY: <i>[Signature]</i>	CHECKED BY: <i>[Signature]</i>
APPROVED BY: <i>[Signature]</i>	DATE: NOVEMBER 12, 1974
SAN FRANCISCO-OAKLAND BAY BRIDGE	
EARTHQUAKE RESTRAINERS	
GENERAL PLAN - W1 TO E1	
SCALE: 1" = 100'	DATE: 12/12/74



504' Truss Spans

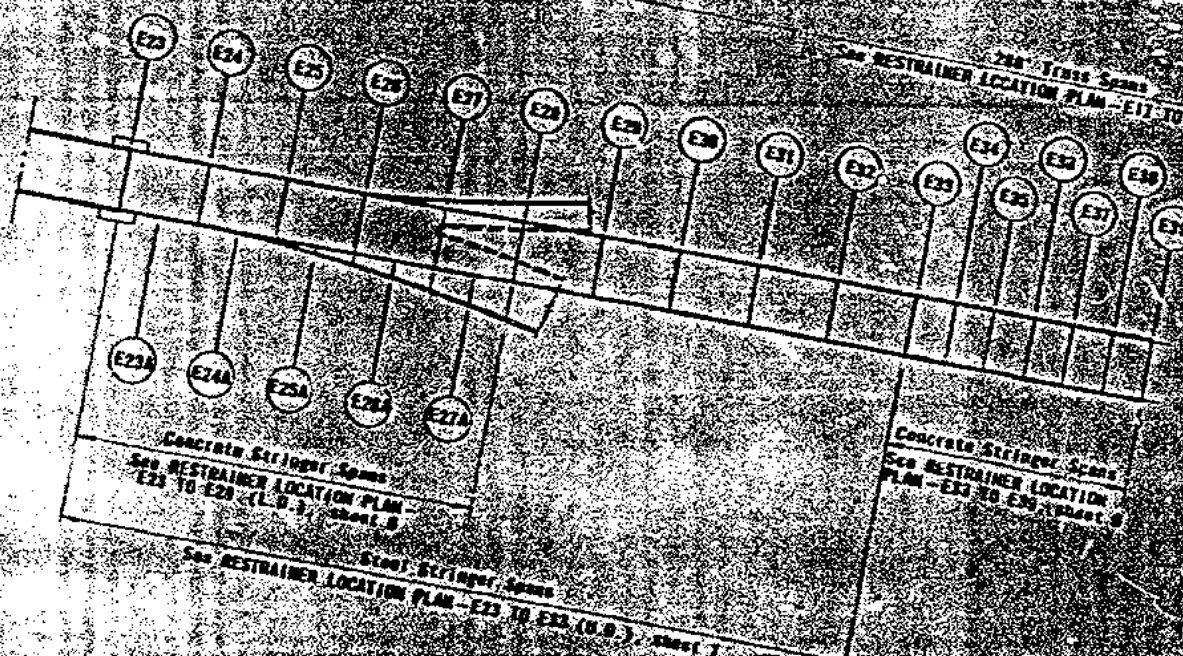


288' Truss Spans

288' Truss Spans

288' Truss Spans

See RESTRAINER LOCATION PLAN - E17 TO E22 - SHEET 5



See RESTRAINER LOCATION PLAN - E23 TO E29 (U.D.) - SHEET 6

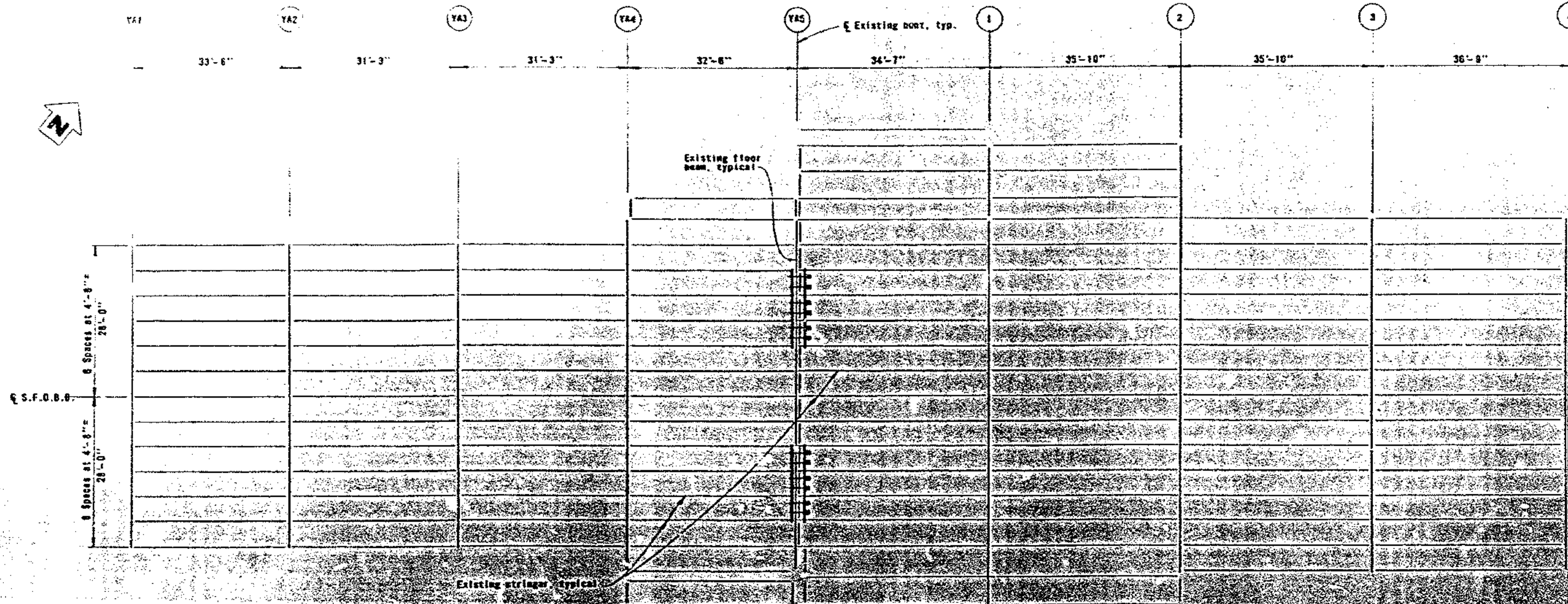
See RESTRAINER LOCATION PLAN - E30 TO E39 (U.D.) - SHEET 7

See RESTRAINER LOCATION PLAN - E30 TO E39 (U.D.) - SHEET 7

SCALE IN INCHES ON ORIGINAL

AS BUILT PLANS

STATE OF CALIFORNIA - HIGHWAY AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION			
PROJECT	SAN FRANCISCO-OAKLAND BAY BRIDGE	DATE	NOVEMBER 12, 1974
DESIGN	EARTHQUAKE RESTRAINERS	BY	AL. FAR
CHECKED		BY	CYC.
APPROVED		S. J. [Signature]	
GENERAL PLAN - E4 TO E39		SCALE 1" = 200'	



PLAN
(Upper and steel framing)

LEGEND



ONE RESTRAINER - TYPE 1

NOTES

1. For details of RESTRAINER - TYPE 1, see sheets 5 and 10.

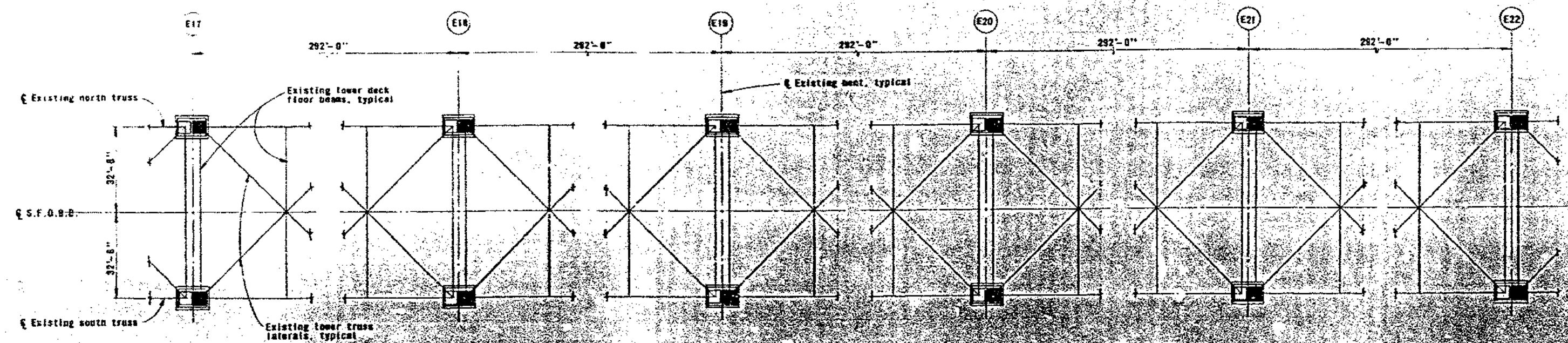


AS BUILT PLANS
Contract No. 24-64156
Date Completed
Document No.

DATE	BY	CHKD	APP'D
11/22/64	W. H. B. J.	W. H. B. J.	W. H. B. J.

STATE OF CALIFORNIA - HIGHWAYS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
EARTHQUAKE RESTRAINERS		RESTRAINER LOCATION PLAN - Y1 TO 4	
APPROVED NOVEMBER 22, 1974		BY: [Signature]	
IN CHARGE OF DESIGN		CHECKED BY: [Signature]	

0-6-6713 0-3



PLAN
(Taken at top of existing lower truss chord)

LEGEND

■ One RESTRAINER-TYPE II

NOTES

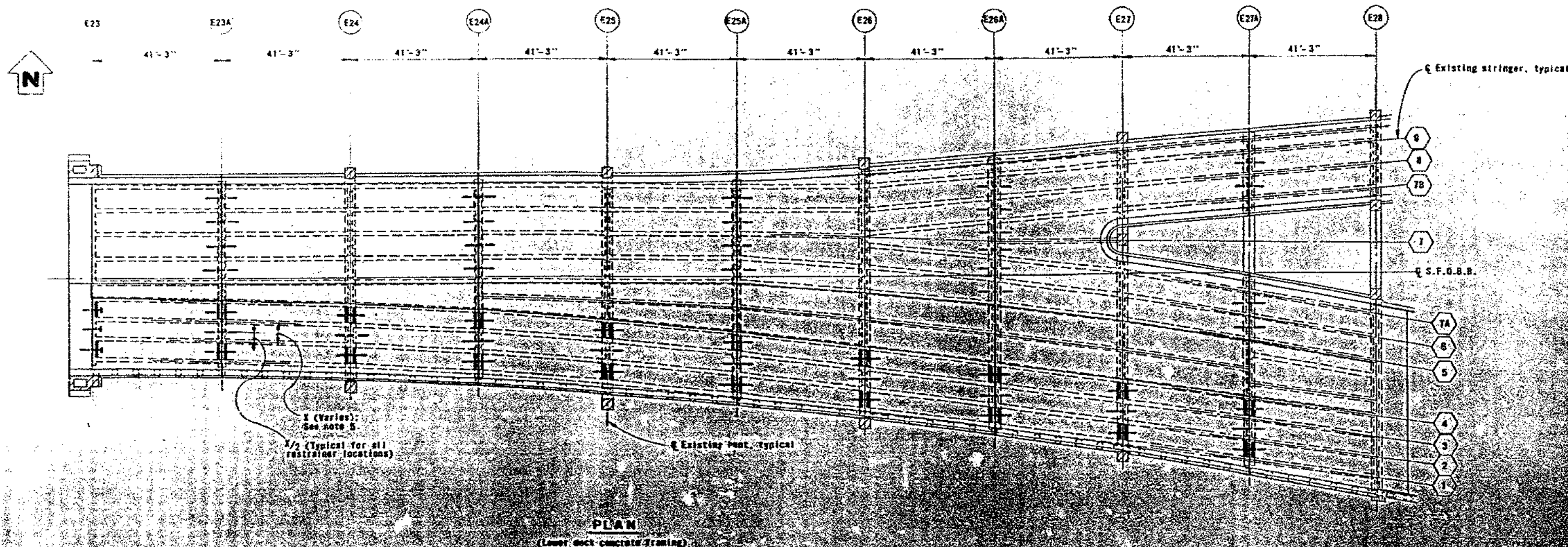
1. For data (13) of RESTRAINER-TYPE II, see sheets 11 and 12.

AS BUILT PLANS
Contract No. 24-64158
Date Completed _____
Document No. _____



1/4" = 1'-0"	As built without restrainer	ALL SCALE
DATE	DATE	DATE

STATE OF CALIFORNIA — HIGHWAYS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION	
Checked by: <i>[Signature]</i> Approved by: <i>[Signature]</i> IN CHARGE OF DESIGN	APPROVED NOVEMBER 12, 1974 <i>[Signature]</i> ENGINEER-IN-CHARGE
SAN FRANCISCO-OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS	
RESTRAINER LOCATION PLAN - E17 TO E22	
Scale: 1" = 20'	Sheet No. 5 Project No. 24-64158-22



NOTES

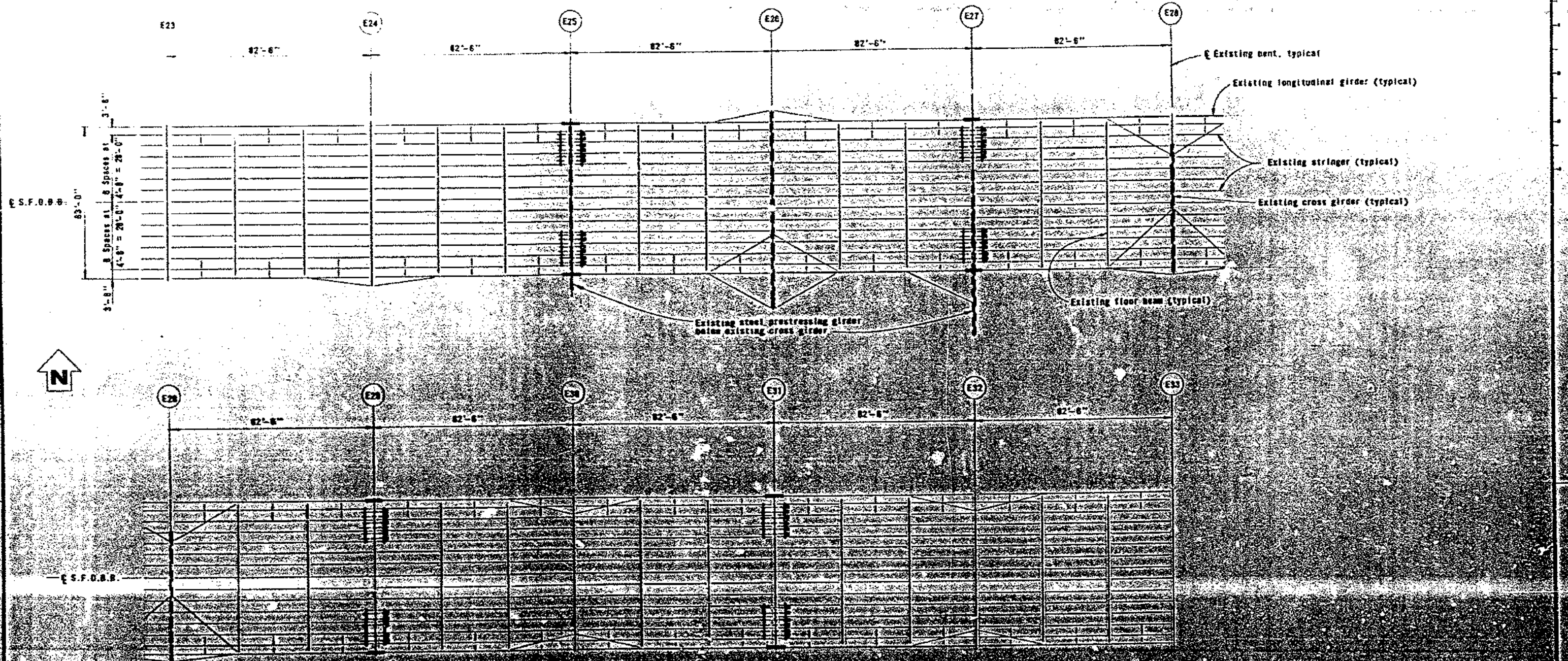
1. For details of RESTRAINER - TYPE IV, see sheet 24.
2. For details of RESTRAINER - TYPE V, see sheet 25.
3. For details of TIEDOWN - TYPE A, see sheet 26.
4. For details of TIEDOWN - TYPE B, see sheet 27.
5. Dimension X varies and is the distance between centers of existing adjacent stringers.

LEGEND

- RESTRAINER - TYPE IV
- RESTRAINER - TYPE V
- TIEDOWN - TYPE A
- TIEDOWN - TYPE B

AS BUILT PLANS
Contract No. 04-64156
Date Completed
Document No.

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
PROJECT NO. 04-64156		EARTHQUAKE RESTRAINERS	
DRAWING NO. 100		RESTRAINER LOCATION PLAN - E23 TO E28 (I.D.)	
DATE: NOVEMBER 12, 1974		SCALE: 1/4" = 1'-0"	
DESIGNED BY: [Signature]		CHECKED BY: [Signature]	
IN CHARGE OF DESIGN: [Signature]		DATE: [Date]	



NOTES
 For details of RESTRAINER - TYPE II - see sheets 10 and 11.

LEGEND

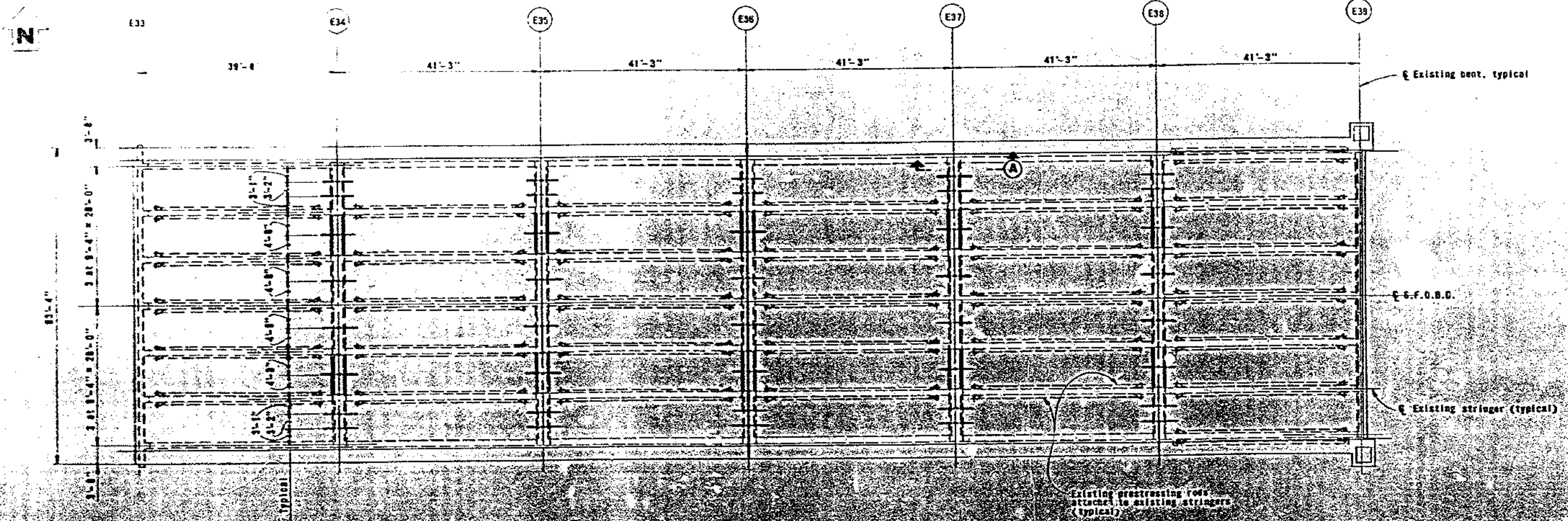


RESTRAINER - TYPE II

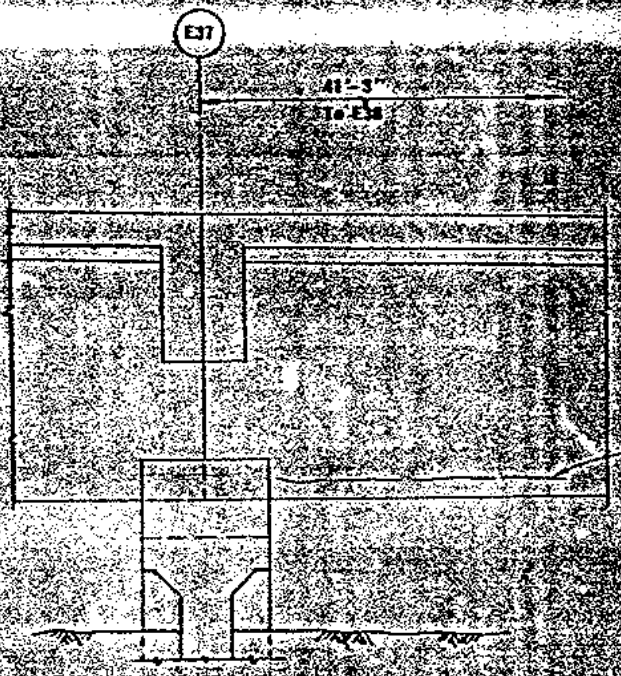


AS BUILT PLANS
 Contract No. 04-6458
 Date Completed
 Document No.

DEPARTMENT OF CALIFORNIA - HIGHWAY AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION - SAN FRANCISCO-OAKLAND BAY BRIDGE PROJECT NO. 04-6458 DRAWING NO. 100-100-100-100 DATE 11/15/58 BY [Signature] CHECKED [Signature]		APPROVED NOVEMBER 15, 1958 [Signature]		SAN FRANCISCO-OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS RESTRAINER LOCATION PLAN - E23 TO E33 (I.D.) SCALE: 1" = 20'	
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PLAN
(Concrete framing)



SECTION A-A
1/2" = 1'-0"

LEGEND

- TIEDOWN - TYPE B
- RESTRAINER - TYPE T

NOTES

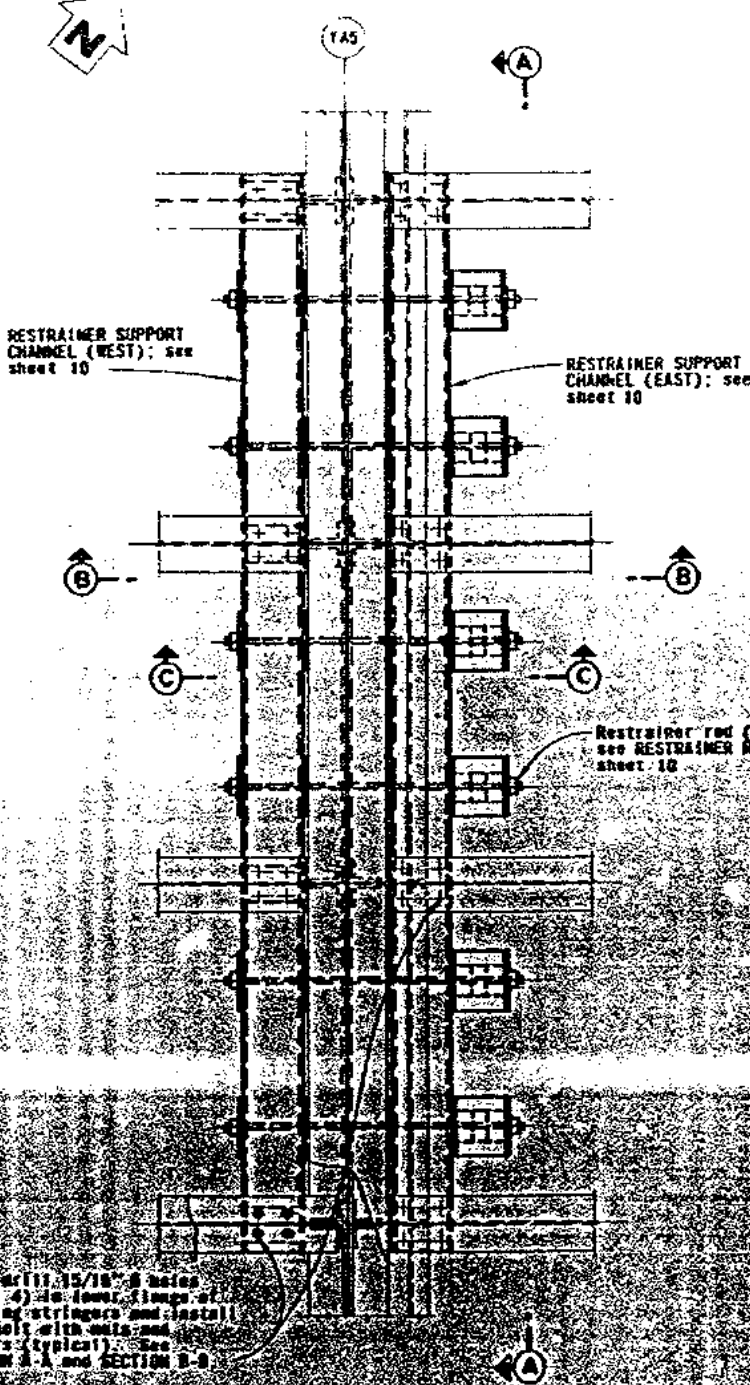
1. For details of RESTRAINER - TYPE T, see sheet 15.
2. For details of TIEDOWN - TYPE B, see sheet 16.



AS BUILT PLANS
Contract No. 04-6415B
Date Completed _____
Document No. _____

STATE OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
APPROVED NOVEMBER 12, 1974		EARTHQUAKE RESTRAINERS	
RESTRAINER LOCATION PLAN - E33 TO E39		SCALE: 1/2" = 1'-0"	
DESIGNED BY: <u>W. J. [Signature]</u> CHECKED BY: <u>W. J. [Signature]</u> IN CHARGE OF DESIGN: <u>W. J. [Signature]</u>		DRAWN BY: <u>W. J. [Signature]</u> CHECKED BY: <u>W. J. [Signature]</u> IN CHARGE OF DRAWING: <u>W. J. [Signature]</u>	

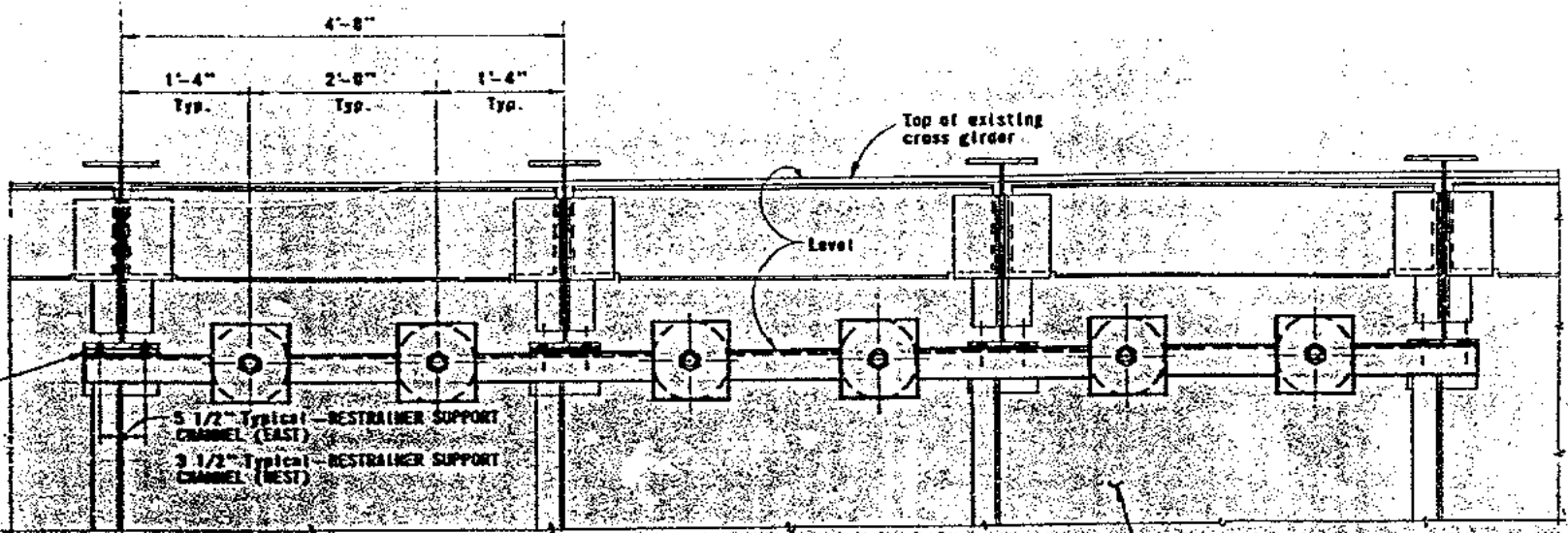
Existing stringer (typical)



FRAMING PLAN DETAIL

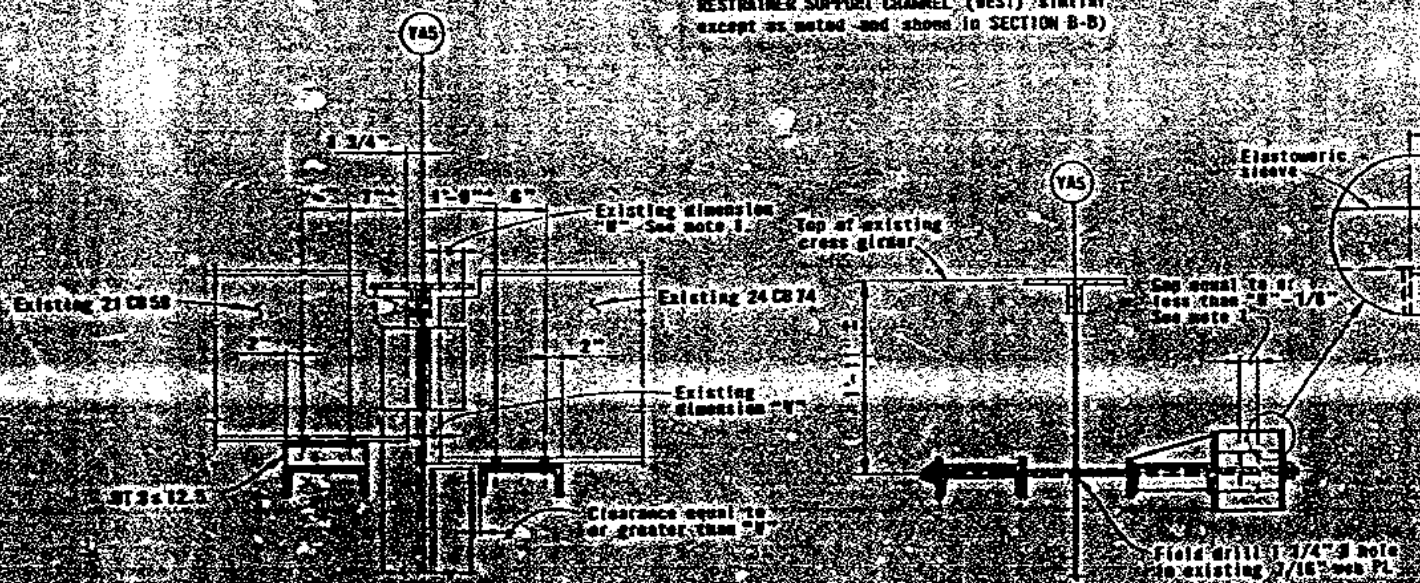
(Taken north of bridge & existing roadway plan not shown)
1/4" = 1'-0"

Provide shims as required:
Between channel and existing CB - RESTRAINER SUPPORT CHANNEL (EAST).
Between WT and existing CB - RESTRAINER SUPPORT CHANNEL (WEST).



SECTION A-A

(RESTRAINER SUPPORT CHANNEL (EAST) shown - RESTRAINER SUPPORT CHANNEL (WEST) similar except as noted and shown in SECTION B-B)



SECTION B-B

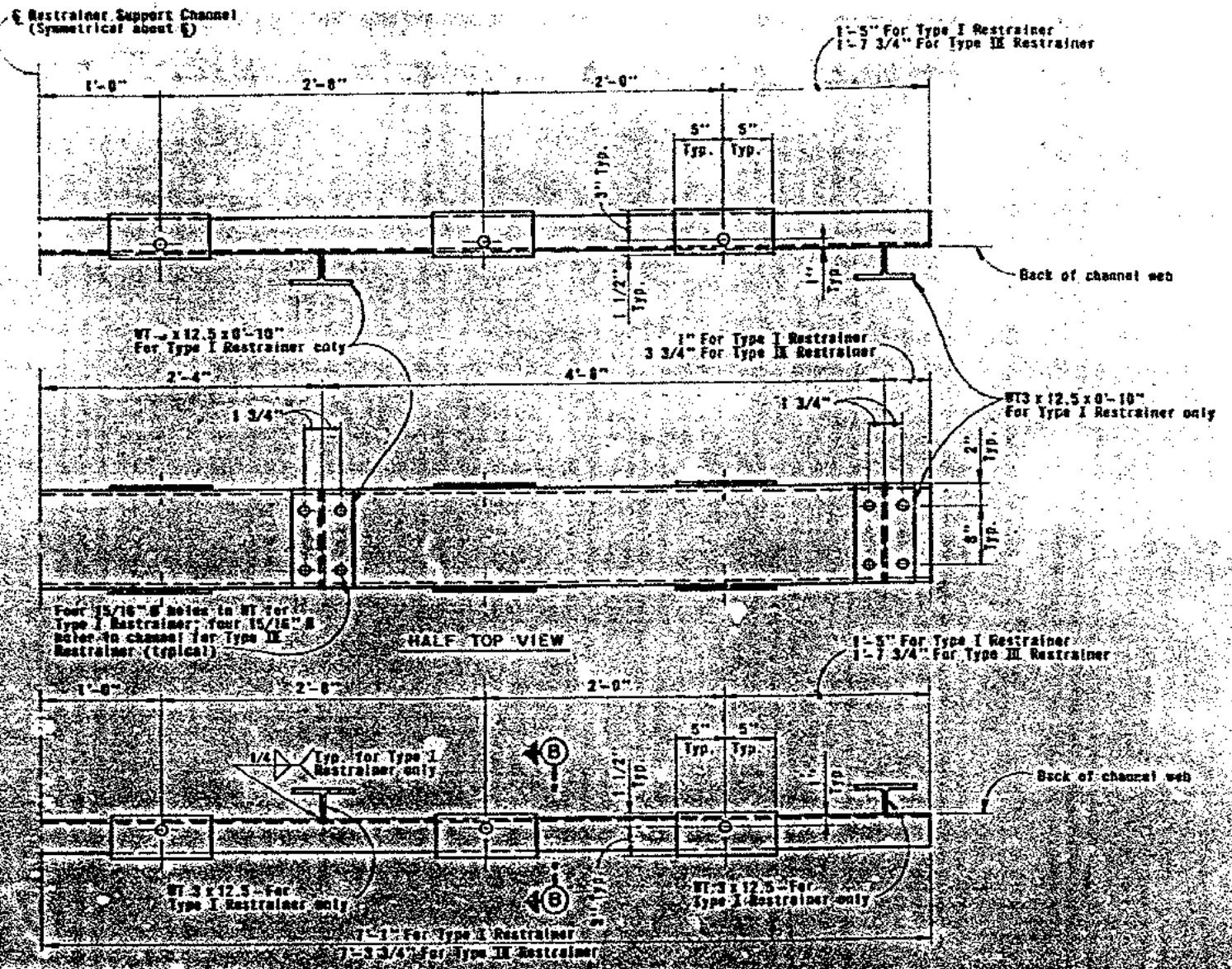
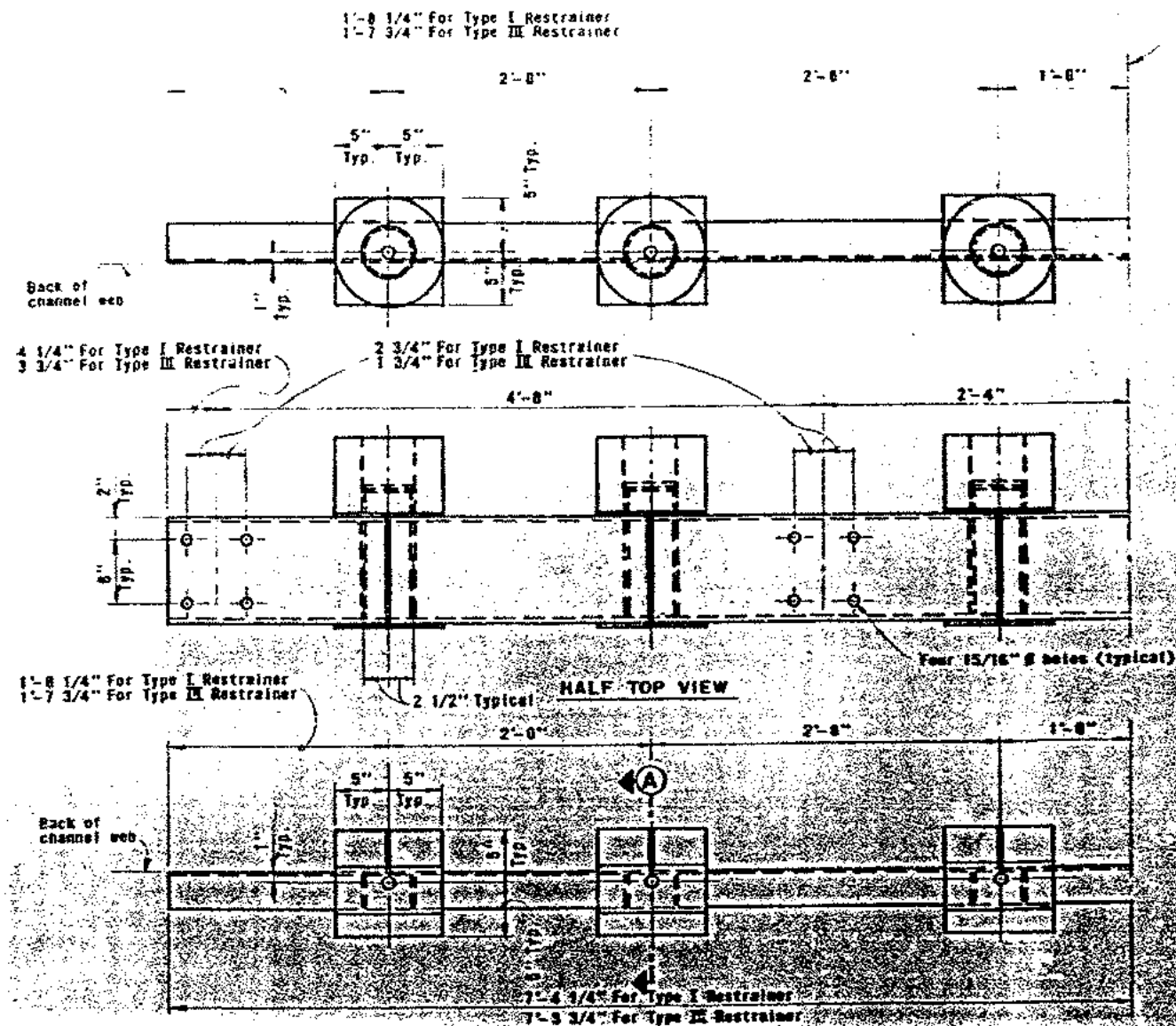
SECTION C-C

NOTES

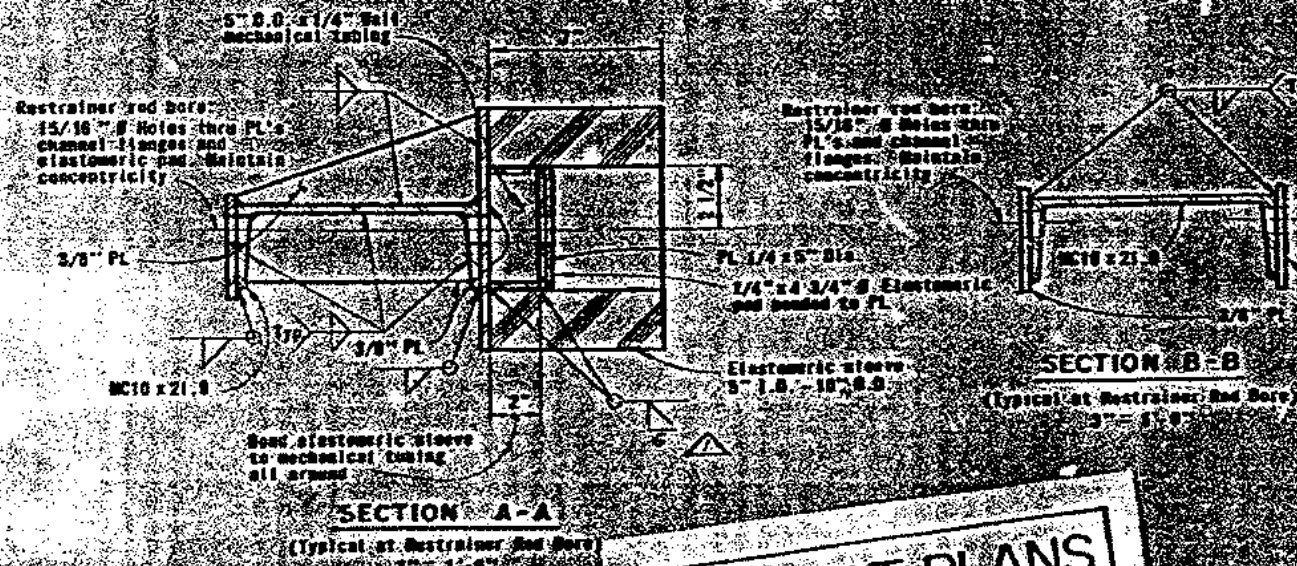
1) After installation of restrainer, existing dimension "V" shall be checked. When this dimension is found that 2 1/2" the restrainer rod nut shall be tightened to reduce the gap in the elastic sleeve to 1/8" less than "V".

AS BUILT PLANS
Contract No. 04-64158
Date Completed
Document No.

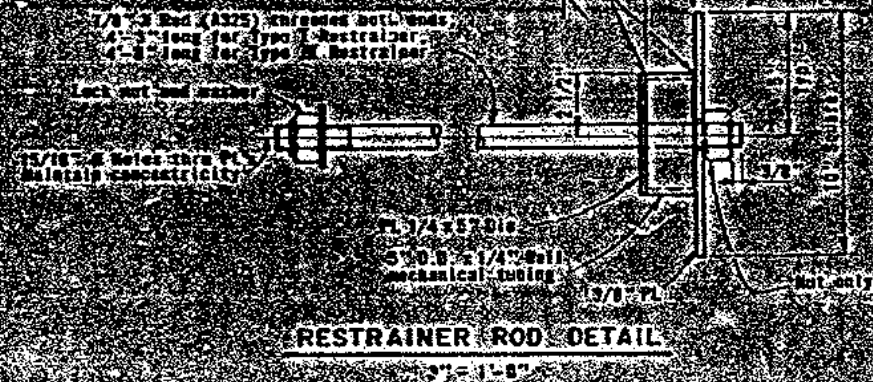
STATE OF CALIFORNIA - HIGHWAY AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION	
SAN FRANCISCO OAKLAND BAY BRIDGE	
EARTHQUAKE RESTRAINERS	
RESTRAINER TYPE I	
APPROVED NOVEMBER 12, 1974	SCALE IN INCHES ON ORIGINAL
DESIGNED BY: [Signature]	CHECKED BY: [Signature]
DATE: [Blank]	DATE: [Blank]



RESTRAINER SUPPORT CHANNEL (EAST)

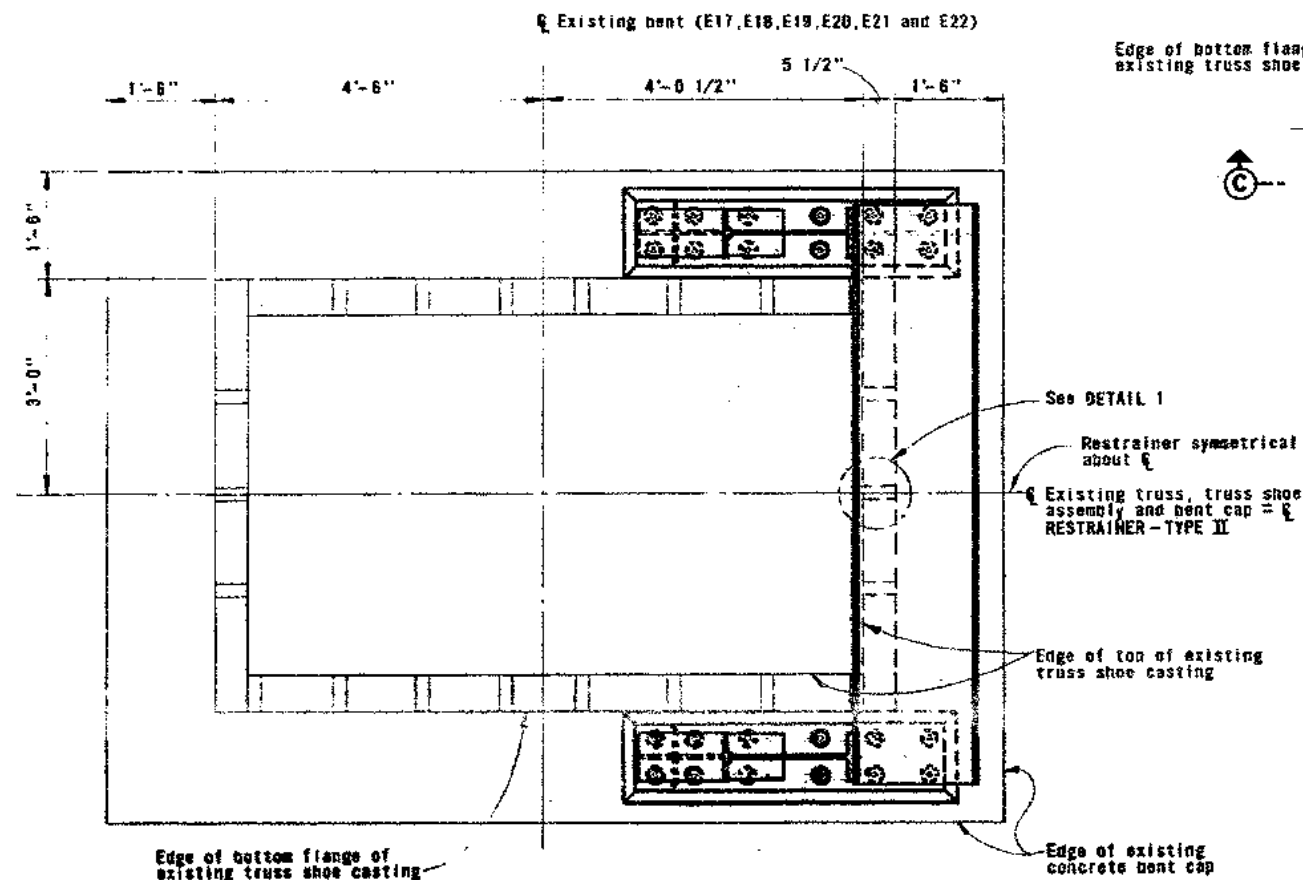


RESTRAINER SUPPORT CHANNEL (WEST)

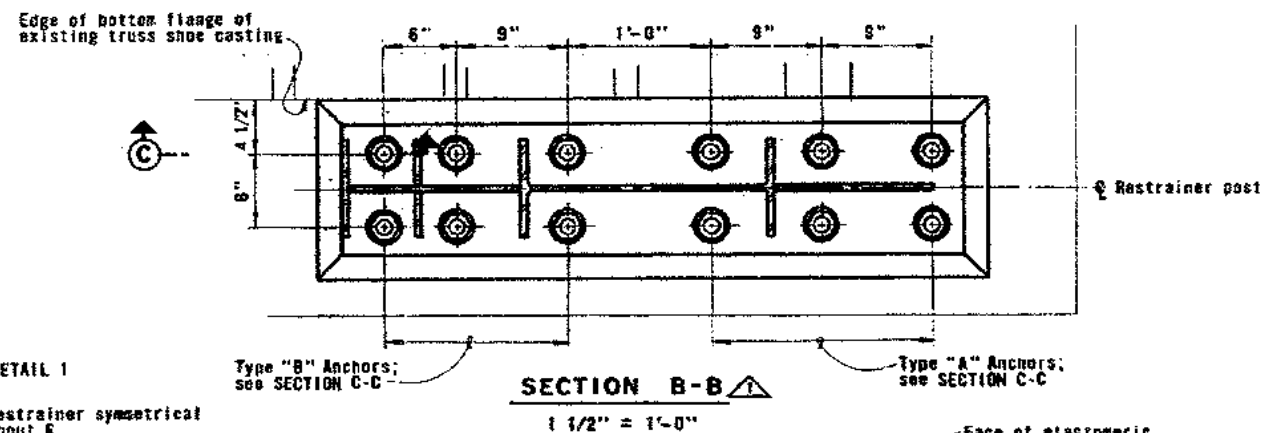


SCALE IN INCHES ON ORIGINAL

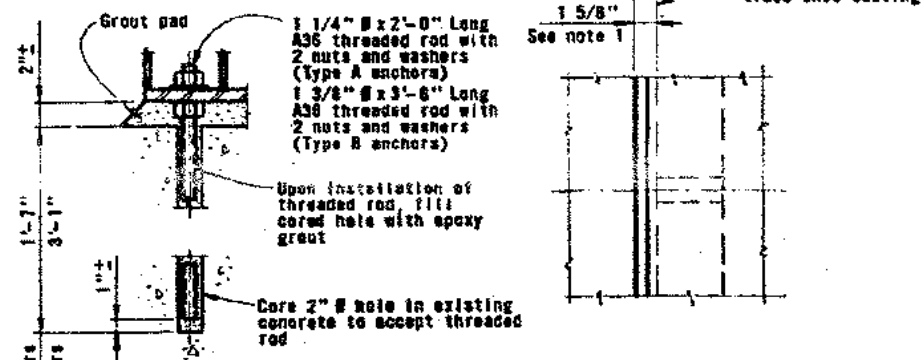
STATE OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO OAKLAND BAY BRIDGE	
PROJECT NO. 04-6456		EARTHQUAKE RESTRAINERS	
RESTRainer DETAILS - TYPE I & TYPE III		NOVEMBER 22, 1974	
DRAWN BY: [Signature]		CHECKED BY: [Signature]	
APPROVED BY: [Signature]		SCALE: 1/2" = 1'-0"	
SHEET NO. 10		C-6456-10	



SECTION A-A
No Scale

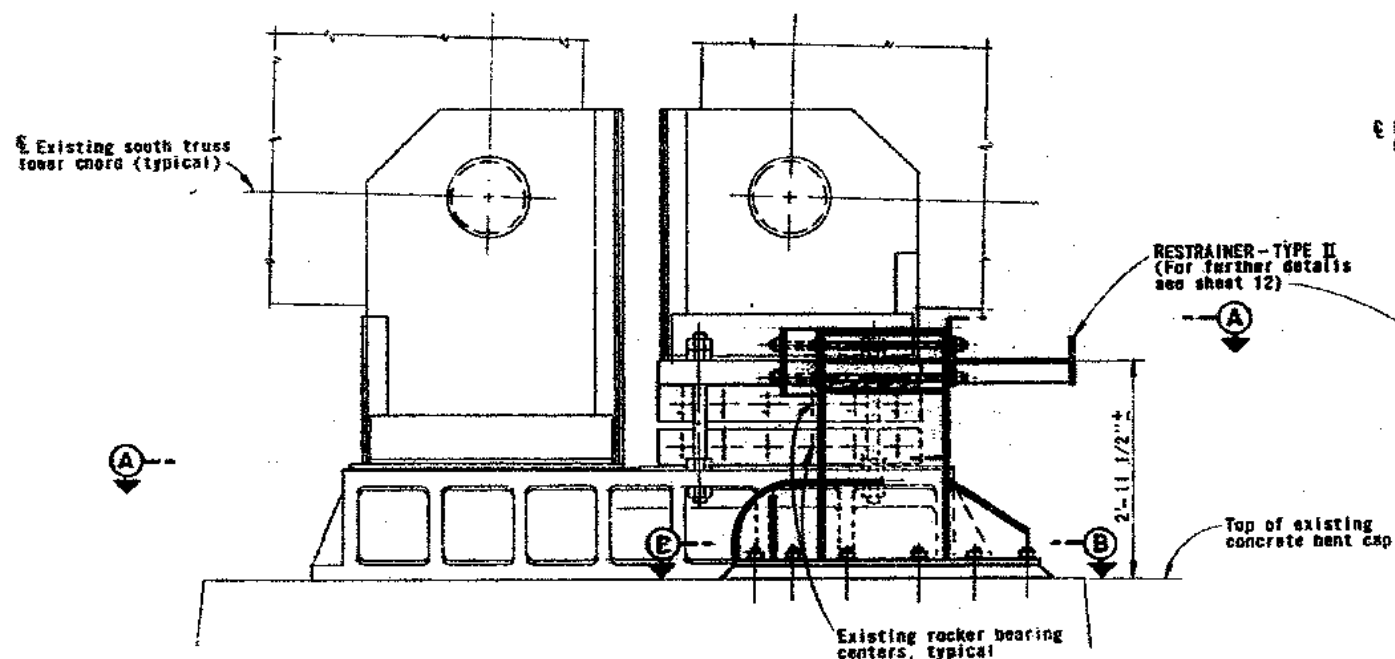


SECTION B-B
1 1/2" = 1'-0"

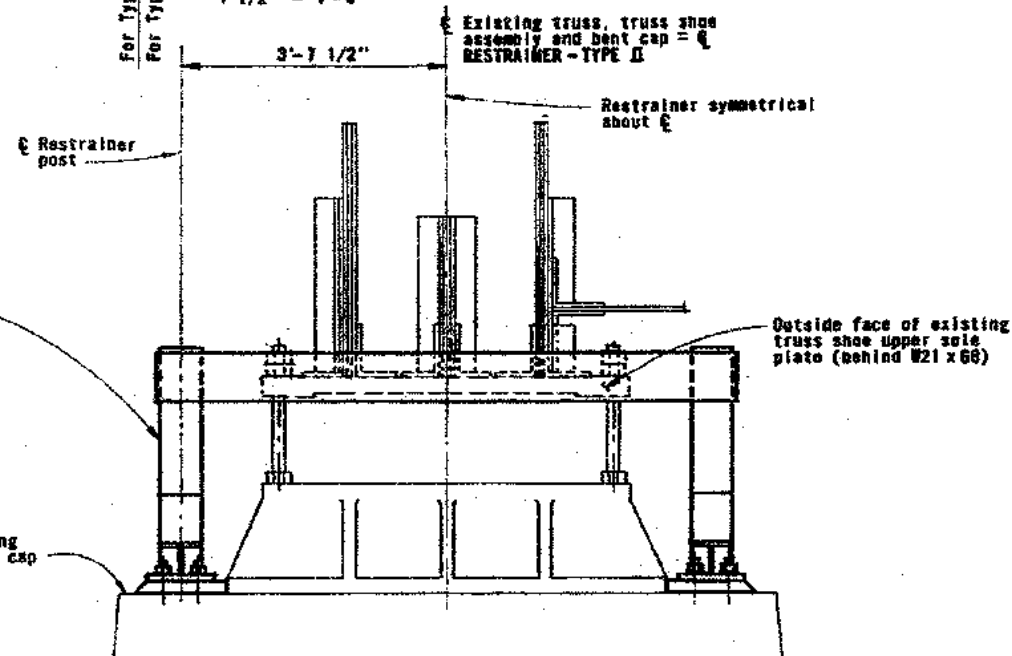


SECTION C-C
(Typical Anchor Detail)
1 1/2" = 1'-0"

DETAIL 1
1 1/2" = 1'-0"



SIDE VIEW
(South side of existing bent cap shown - North side similar)
No Scale



END VIEW
No Scale

NOTES

1. Dimension shown was calculated using existing truss erection dimensions which assumed an ambient temperature of 62° F. The distance between the outside face of the existing truss shoe upper sole plate and the WF with elastomeric pad shall be 1 1/2" when the rocker bearing centers are aligned in a vertical position. This dimension varies from restrainer to restrainer, as the lower sole plate also shows a tendency to move.



AS BUILT PLANS
Contract No. 04-64158
Completed

1	4/2/76	As built with revision	B.L.	FAR
1	5/75	Restrainer - Type II Redesign	AK	4/4
NAME	DATE	REVISION	BY	CHK.

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION			
DESIGNED BY: <i>H. J. [signature]</i>	CHECKED BY: <i>[signature]</i>	APPROVED: MARCH 19, 1975	
DRAWN BY: <i>[signature]</i>		SAN FRANCISCO-OAKLAND BAY BRIDGE	
IN CHARGE OF DESIGN: <i>[signature]</i>		EARTHQUAKE RESTRAINERS	
RESTRAINER - TYPE II			
SCALE: AS SHOWN	SHEET NO. 11	DRAWING NO. C-64158-118-1	

1/4"x6" Elastomeric pad bonded to flange of W21x68

W21x68

Restrainer (Symmetrical about E)

Restrainer post (W21x62)

Restrainer post (W21x62)

W21x68

Restrainer post (W21x62)

10 Elastomeric pads 8"x11"x1/2" thick (Bond both faces to steel)

SECTION A-A

SECTION B-B

VIEW C-C

SECTION D-D

HALF TOP VIEW

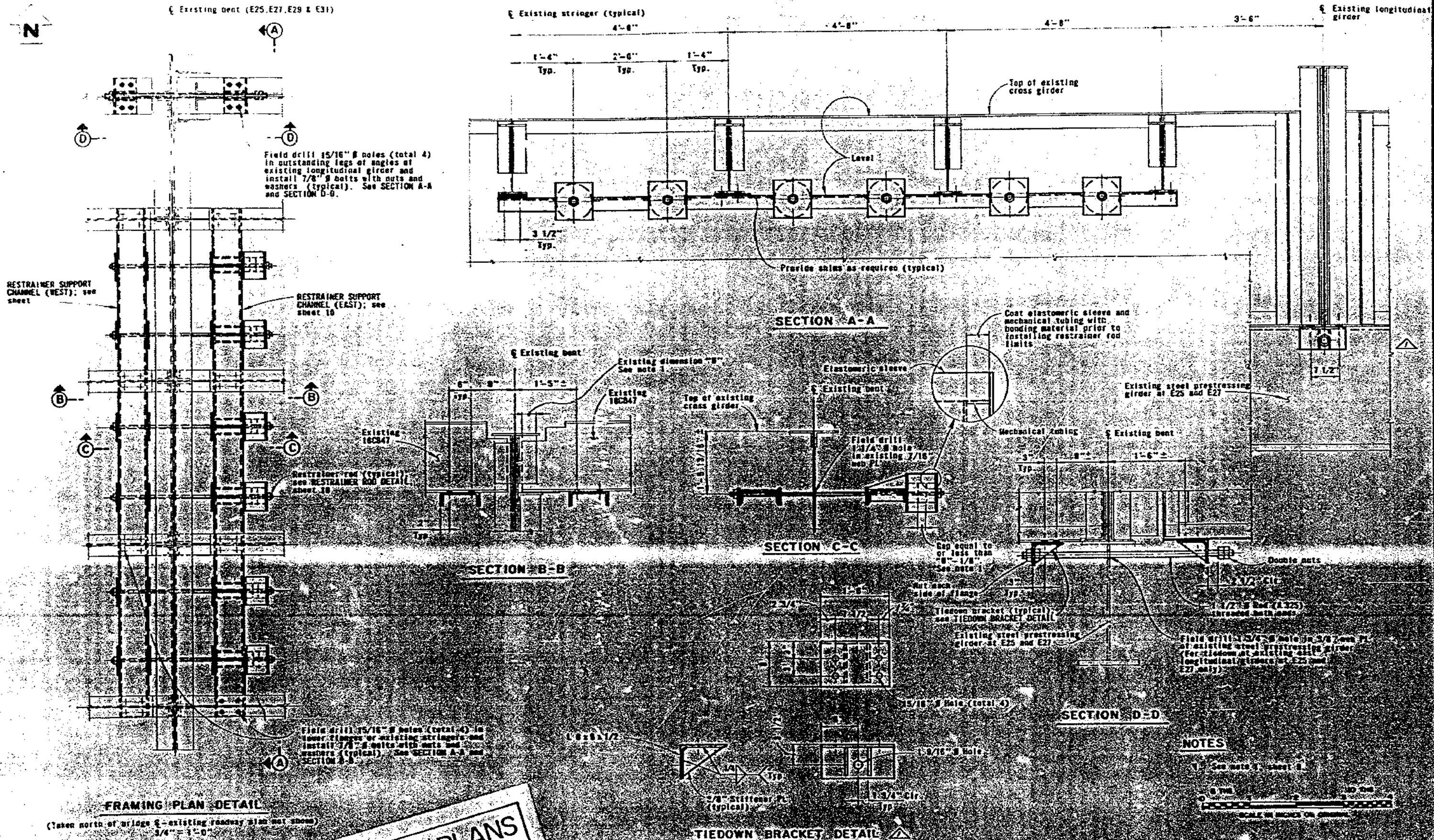
SECTION E-E

SECTION F-F

SIDE VIEW

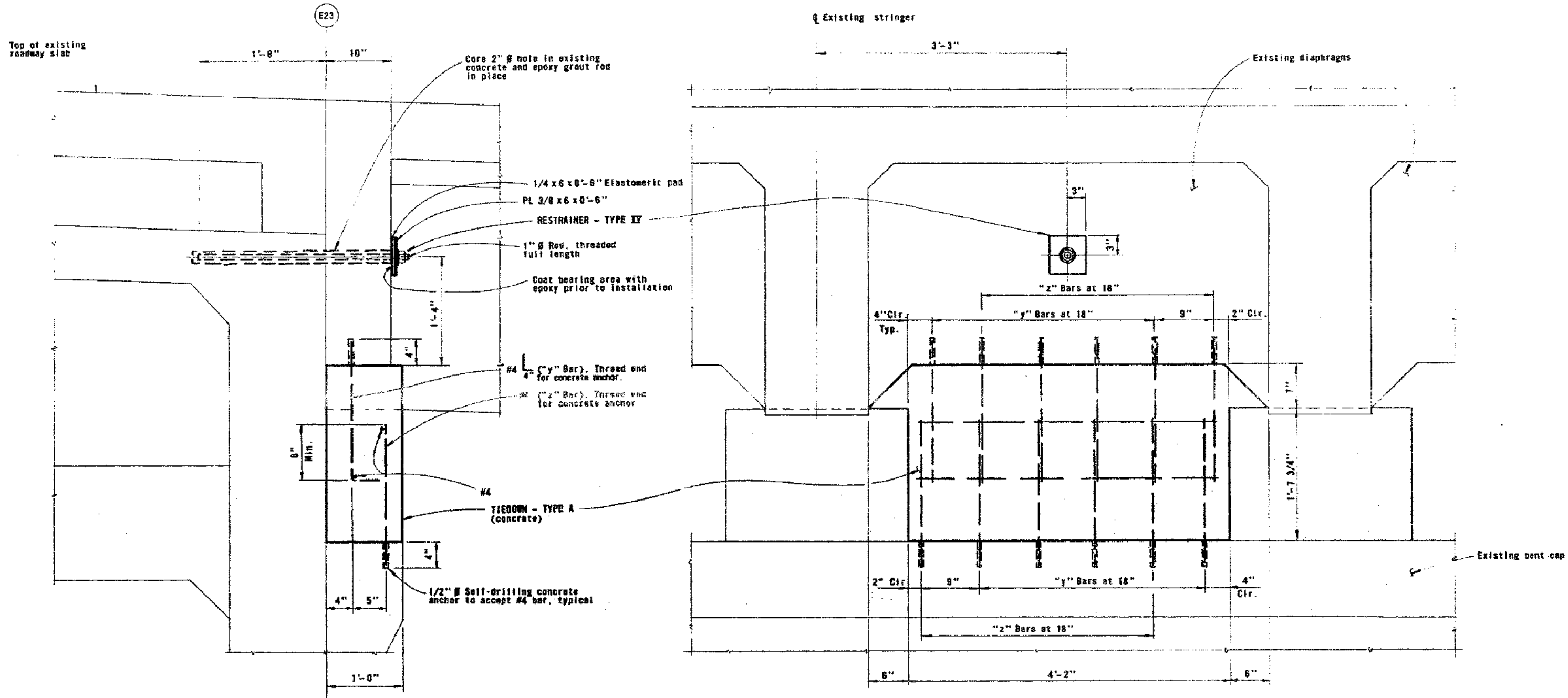
AS BUILT PLANS
Contract No. 04-64155
Date Completed
Document No.

STATE OF CALIFORNIA - HIGHWAYS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
PROJECT: EARTHQUAKE RESTRAINERS		RESTRAINER DETAILS - TYPE II	
DATE: MARCH 19, 1975		SCALE: 1/2" = 1'-0"	
DESIGNED BY: [Signature]		CHECKED BY: [Signature]	
IN CHARGE OF DESIGN: [Signature]		APPROVED BY: [Signature]	



AS BUILT PLANS
 Contract No. 04-64156
 Date Completed
 Document No.

STATE OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
EARTHQUAKE RESTRAINERS		RESTRAINER TYPE III	
APPROVED NOVEMBER 12, 1974		SCALE IN INCHES ON SHEET	
BY: [Signature]		CHECKED: [Signature]	
DESIGNED: [Signature]		DRAWN: [Signature]	
REVISIONS		REVISIONS	
NO.	DESCRIPTION	NO.	DESCRIPTION
1	As built with revision	1	As built with revision



NOTES

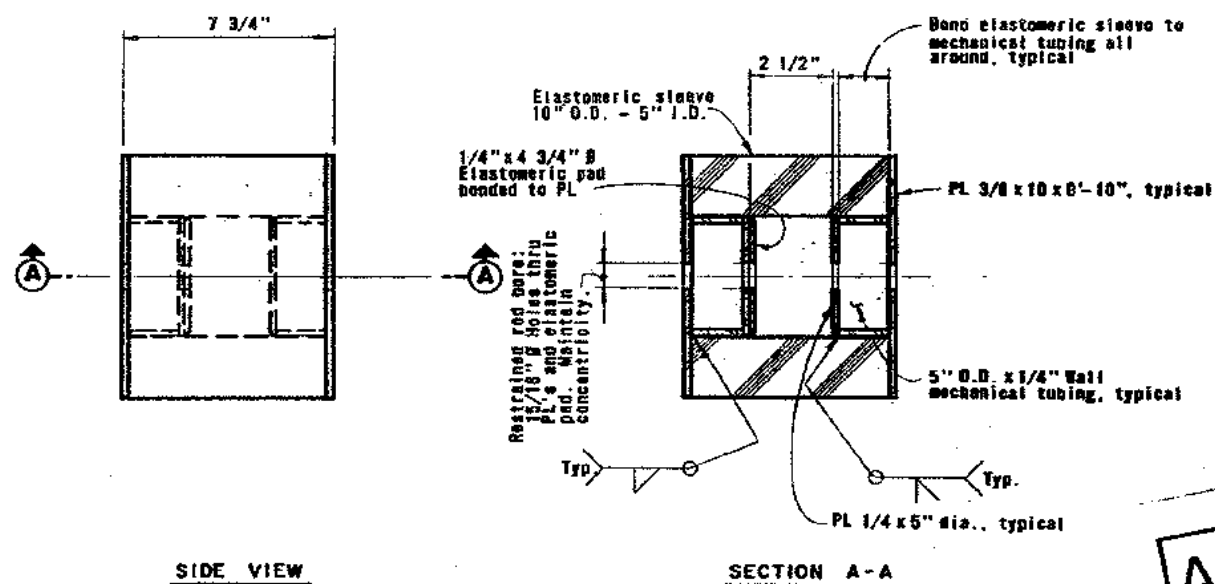
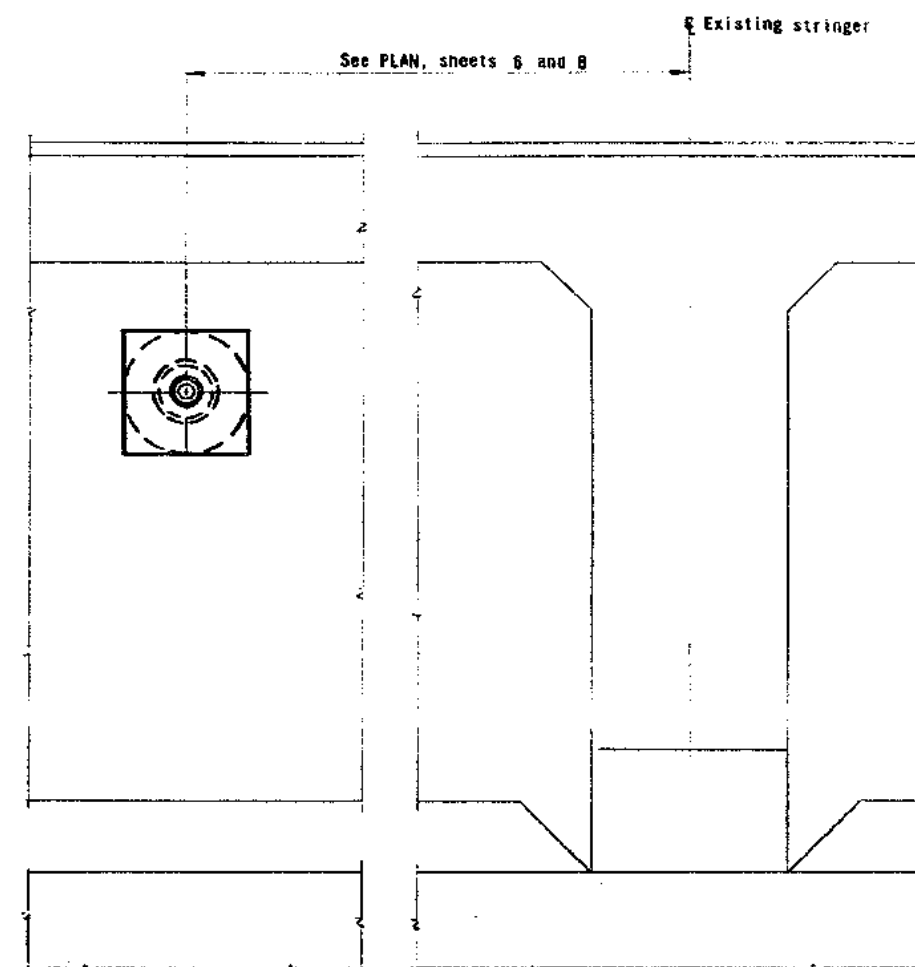
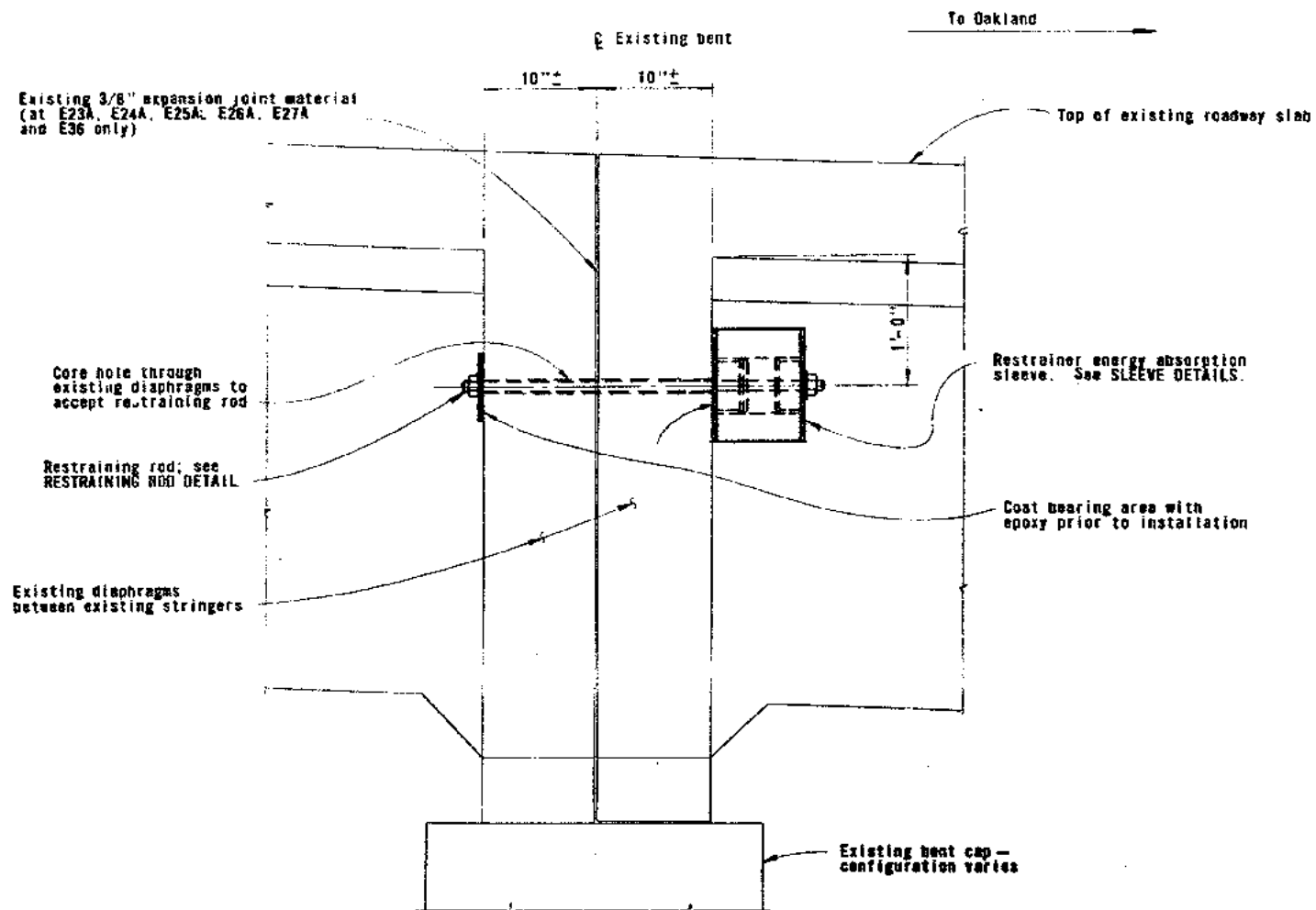
1. TIEDOWN - TYPE A and RESTRAINER - TYPE IX do not necessarily occur together between adjacent existing stringers. See sheet 6.



AS BUILT PLANS
Contract No. 24-64/56
Date Completed
Document No.

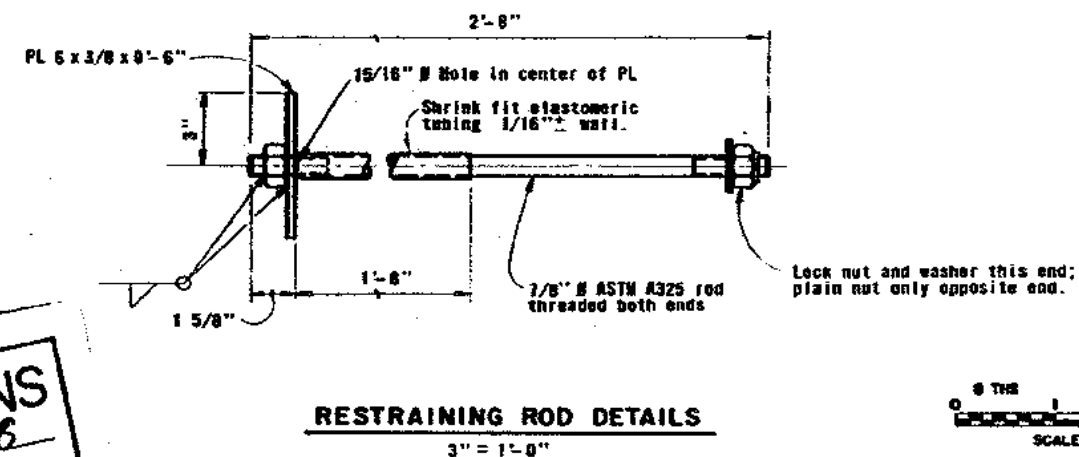
DATE	REVISION	BY	CHK.
4-2-76	As built without revision	B.L. FAR	

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION			
DESIGNED BY <i>W. J. J.</i>	CHK. <i>R. J. J.</i>	APPROVED NOVEMBER 12, 1974	
DRAWN BY <i>R. J. J.</i>	CHK. <i>W. J. J.</i>	S. Larsen	
IN CHARGE OF DESIGN <i>R. J. J.</i>		REGISTERED ENGINEER CIVIL	
SAN FRANCISCO-OAKLAND BAY BRIDGE			
EARTHQUAKE RESTRAINERS			
RESTRAINER - TYPE IX & TIEDOWN - TYPE A			
SCALE 1 1/2" = 1'-0"	SHEET NO. 14	DRAWING NO. C-64158-142	



SLEEVE DETAILS

3" = 1'-0"



AS BUILT PLANS

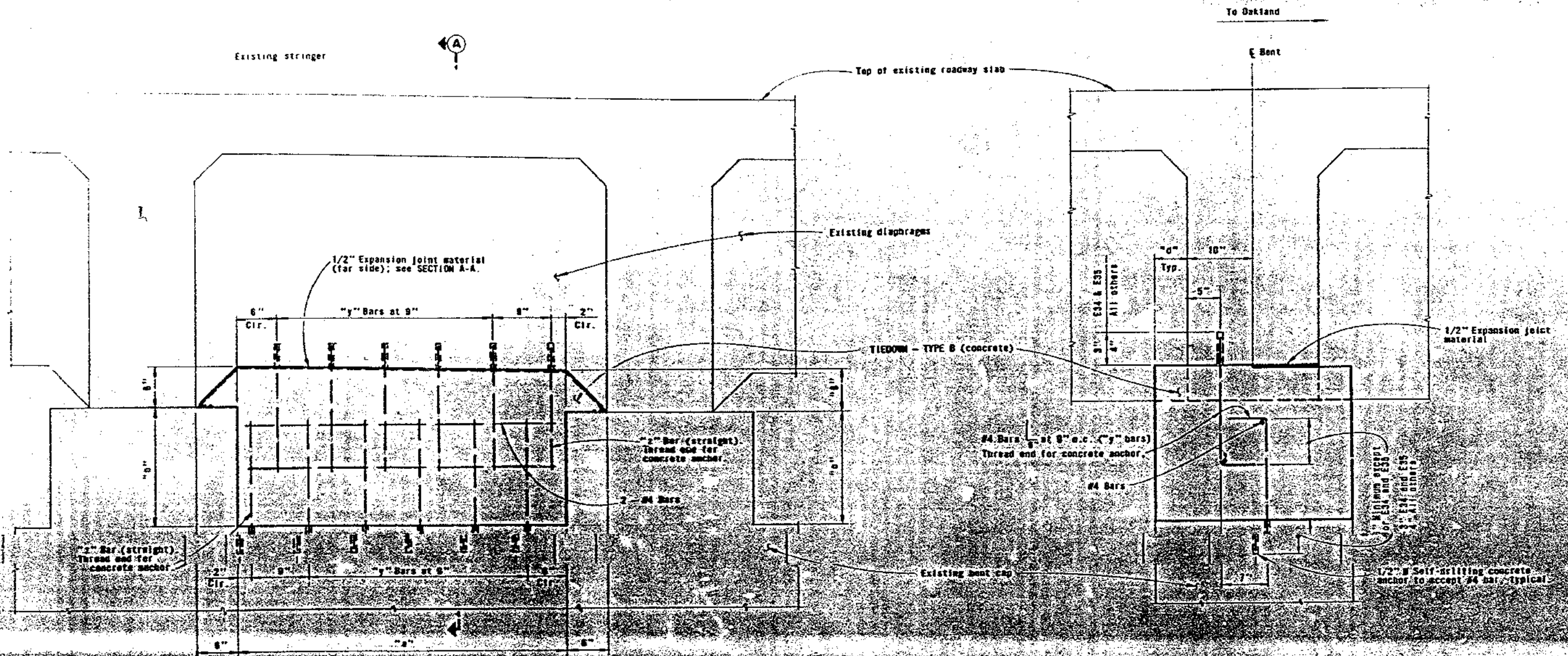
Contract No. 04-64156

Date Completed

Document No.

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION			
DESIGN	BY <i>W. G. G.</i>	CHECKED <i>R. B. B.</i>	SAN FRANCISCO-OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS
PERMIT	BY <i>W. G. G.</i>	CHECKED <i>W. G. G.</i>	
IN CHARGE OF DESIGN	BY <i>W. G. G.</i>	CHECKED <i>W. G. G.</i>	
APPROVED NOVEMBER 12, 1974			RESTRAINER - TYPE 3
DRAWN <i>S. Larsen</i>			SCALE UNLESS NOTED 1 1/2" = 1'-0"
SHEET NO. 15			DRAWING NO. C-64158-15R

4-2-3	As built without revision	BL	FAR
DATE	REVISION	BY	CYC



PARTIAL BENT ELEVATION

SECTION A-A

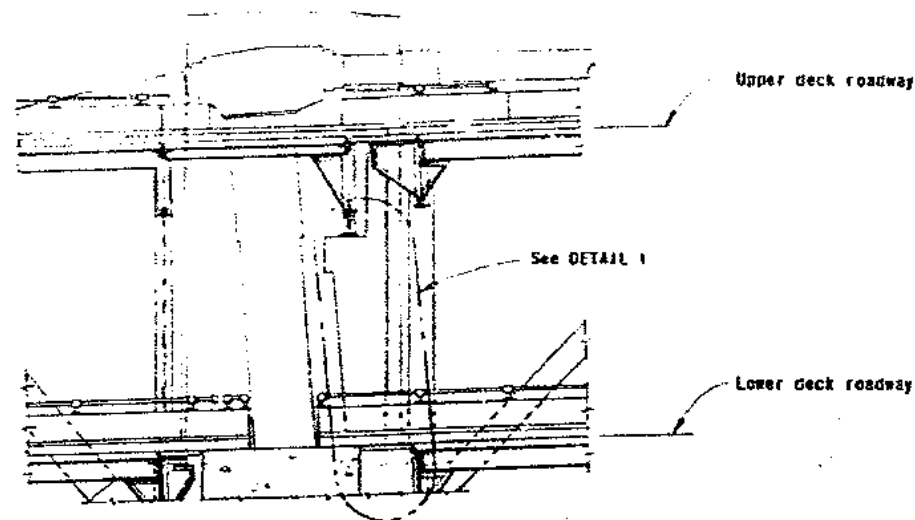
BENT	E22A		E24		E24A		E25		E25A		E26		E26A		E27		E27A		E34		E35		E36		E37		E38	
DIMENSION	Between 1-2	Between 3-4	Between 1-2	Between 3-4	Between 1-2	Between 3-4	Between 1-2	Between 3-4	Between 1-2	Between 3-4	Between 1-2	Between 3-4	Between 1-2	Between 3-4	Between 1-2	Between 3-4	Between 1-2	Between 3-4	North	South	North	South	North	South	North	South	North	South
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
2	10.0	10.2	10.2	10.4	14.3	17.2	42.1	45.9	48.0	45.8	41.5	38.7	29.7	26.3	8.2	11.3	12.0	13.6	0.0	0.0	1.0	1.0	16.5	5.5	40.5	10.5	15.5	5.5
3	19.0	20.3	17.0	18.4	15.7	18.5	23.8	17.0	11.0	15.4	20.1	12.2	9.0	11.0	10.3	12.4	12.7	14.5	0.0	0.0	1.0	1.0	12.5	6.5	21.0	14.0	7.5	5.5
4	4.0	4.0	11.0	11.0	4.0	4.0	11.0	11.0	4.0	4.0	11.0	11.0	13.0	13.0	11.0	11.0	13.0	13.0	5.0	5.0	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0

NOTE: The dimensions in this table are approximate only and do not take into consideration the clear angle between existing diaphragms and stringers which occurs at certain bents as shown on RESTRAINER LOCATION PLAN - E23 TO E28 (L.D.)

AS BUILT PLANS
Contract No. 04-6415B
Date Completed
Document No.

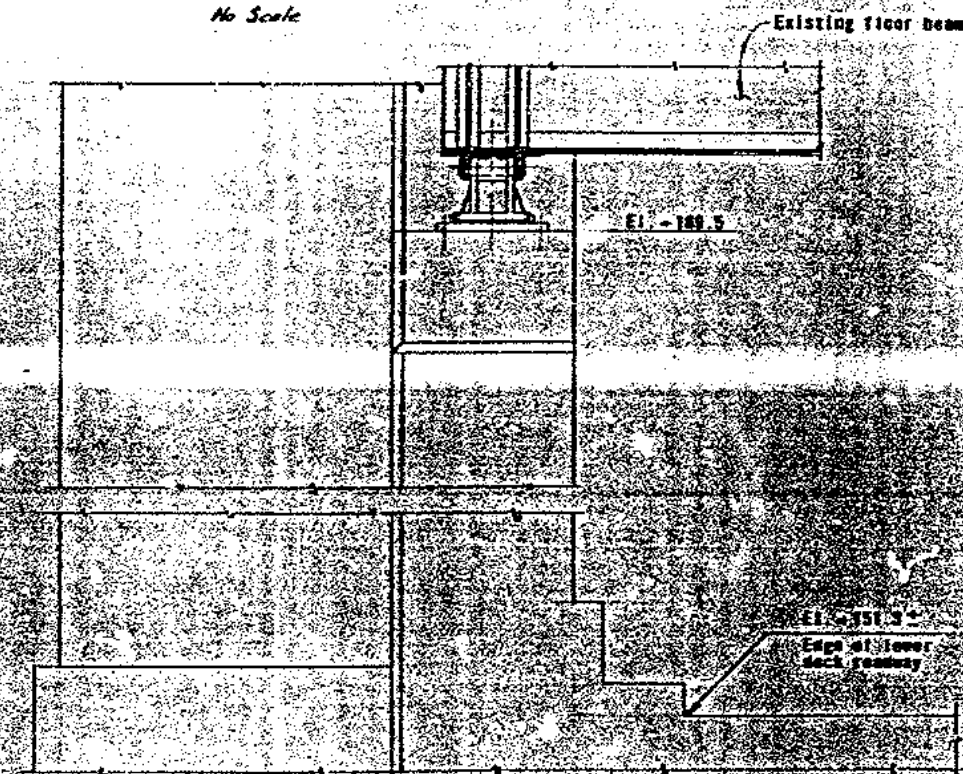
420 1/2" bent with restrainer
DATE: 11/12/74
BY: [Signature]
CHECKED: [Signature]
SCALE: 1/4" = 1'-0"

STATE OF CALIFORNIA - SHIELDS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
EARTHQUAKE RESTRAINERS		TIEDOWN TYPE B	
APPROVED NOVEMBER 12, 1974		DATE: 11/12/74	
[Signature]		[Signature]	
[Signature]		[Signature]	

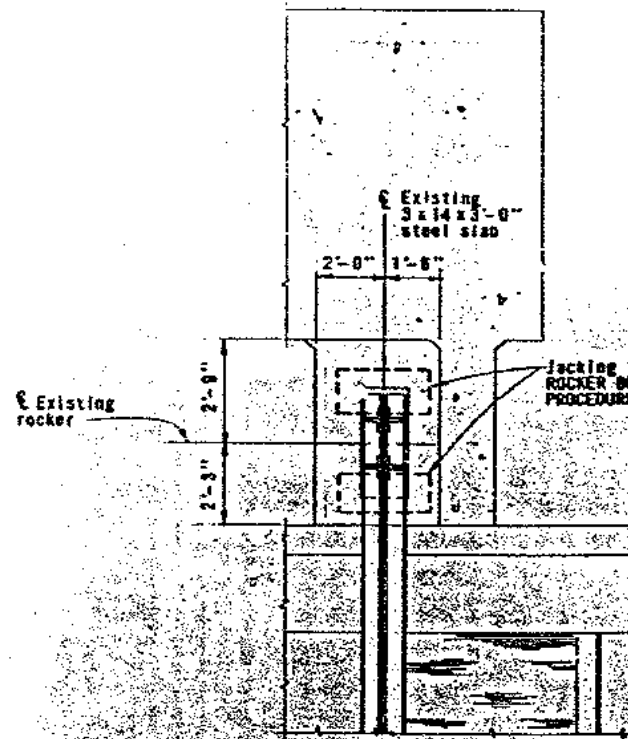


SECTION A-A

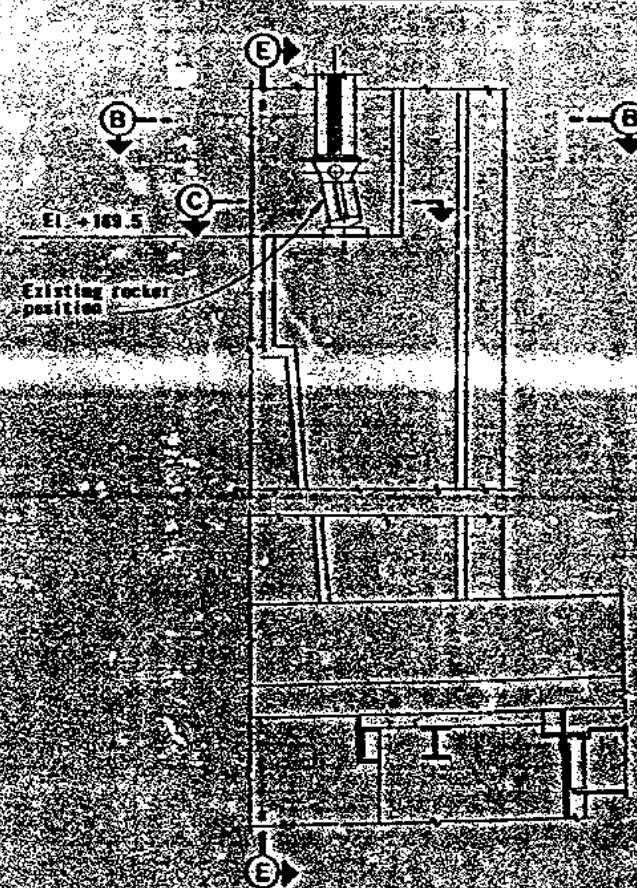
(North side looking North)
(South side opposite hand)
Sheet 2
No Scale



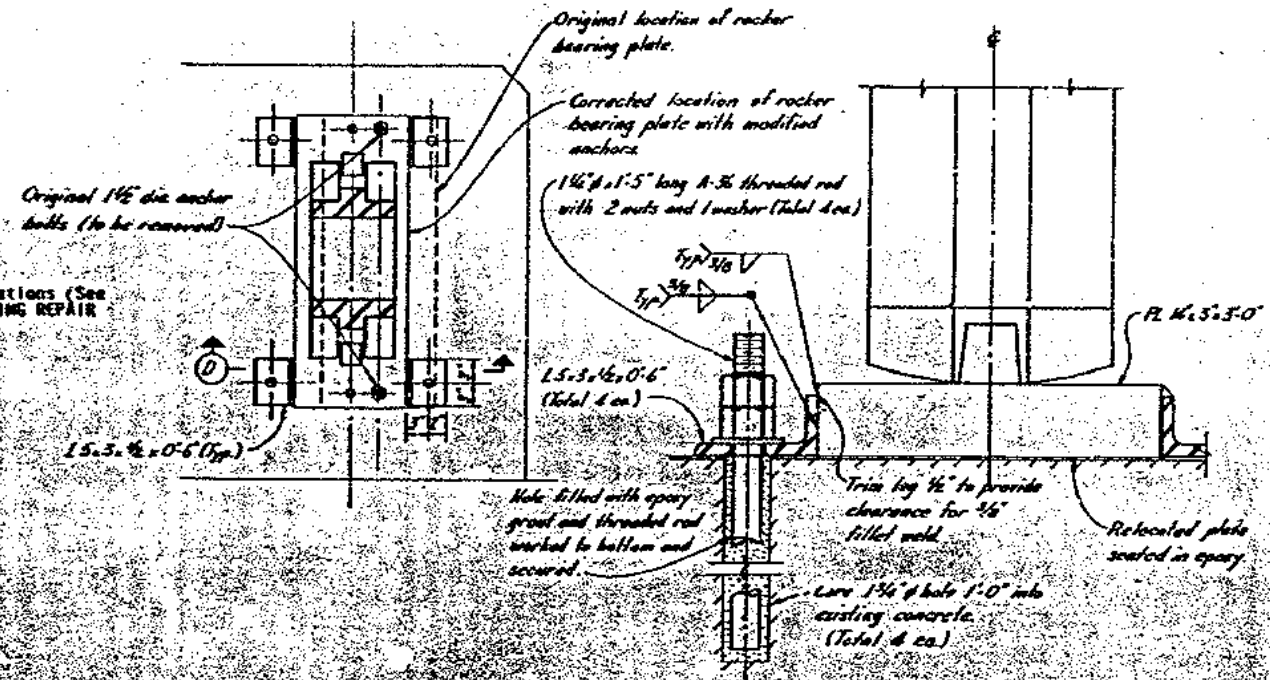
SECTION E-E



SECTION B-B



DETAIL 1



SECTION C-C
(See ROCKER BEARING REPAIR PROCEDURE)
1'-1'-0"

SECTION D-D
(See ROCKER BEARING REPAIR PROCEDURE)
5'-1'-0"

ROCKER BEARING REPAIR PROCEDURE

1. Core drill and install two new 1 1/2" dia anchor bolts in epoxy on west side of base plate.
2. Remove existing 1 1/2" dia anchor bolts.
3. Jack existing floor beam to relieve load and reposition existing rocker to align with center line of floor beam. Jacking devices used shall have a combined rating of 40 tons minimum.
4. Hold steel new angles 1.5x3x1/2x0-6 to west side of existing base plate.
5. Core drill and install the other two anchor bolts in epoxy.
6. Weld remaining angles to existing base plate.

AS BUILT PLANS
Contract No. 24-64158
Date Completed
Document No.